Smart Shopping Trolley

Dr. D. K. Shedage
AISSMS's IOIT,
Dept. Of E&TC

Veena Baravkar
AISSMS's IOIT,
Dept. Of E&TC (71815132B)

Kamini Bava
AISSMS's IOIT,
Dept. Of E&TC (71815134J)

Sahil Bamoo
AISSMS's IOIT,
Dept. Of E&TC (71815577H)

Abstract — Before this time, there was no real automated monitoring system, and tasks such as checking out groceries at the store/malls or counting inventory were completed manually. Oftentimes this was not only time-consuming and laborious but also inaccurate. For implementing this, we have proposed a system based on the Internet Of Things (IoT) technology which will have the components: Microcontroller (Arduino UNO - for each trolley), RFID module for the product identification, a ZigBee module for communicating with the central billing server. In which we had used RFID sensors that depend on wireless communication. Every product has an RFID tag and every shopping cart contains an RFID reader that reads the product information. Then the information about each product is shown on the LED display. Then shopping data is sent to the server wirelessly and automatically generates billing. By applying this technology in shopping malls will reduce manpower and help to ease shopping. In the future, this advanced system can easily replace the current system. That is why the proposed model is more compatible than the traditional one.

Index Terms—RFID, Smart Trolley, Shopping malls, Billing units, Zigbee unit.

I. INTRODUCTION

"Smart shopping trolley" is an advancement over a traditional method. These trolleys will have their billing units which will ultimately reduce the billing desk queues and increase the shopping experience for the customers.

II. LITERATURE SURVEY

1. Smart shopping cart with automatic billing system through RFID and ZigBee

Authors: P. Chandrasekar, T. Sangeetha

Published in: International Conference on Information Communication and Embedded Systems (ICICES2014)

This paper suggests a method that is based on the RFID and ZigBee which creates an automated central billing system for the shopping malls. eliminating the queues and displaying the real-time price of the items in the cart.

2. RFID Based on smart shopping and Billing

Authors: Zeeshan ali, Prof. Reena Sonkusare

Published in: IEEE Conference 2013

In this paper, more utilization of LCD like removing the item by cancel button on LCD implemented. It explains how to access real-time information about the diverse products inside the shopping cart.

3. Innovative shopping cart for smart cities

Authors: Prasiddhi K, Dhanashree H. Gawali

Published in: IEEE Conference 2017

The proposed system consists of some new smart features incorporated compared to other systems. Here provision is made for a truly beneficial budget setting. Customers will get the real time statistics/condition/information of the product which will ultimately help them to choose a best suited product for their needs.

Automation product detection and smart billing for shopping using Light-Fidelity

Authors: Ezhil Azhagan, R. Adithya, Y.L. Burhanuddin, F.charles

Published in: IEEE Conference 2016

It has features incorporated with automatic recognition of products by means of optical fibers using Li-Fi technology. The payment is processed through mobile banking or money payment and therefore the cart system can verify the products and complete the transaction successfully.

III. OBJECTIVES

The system will play an important role in improving the customer experience, following are the primary objectives of the system.

1) To cut out the delays in supply chains caused by the traditional system.

2)This system is highly efficient and economically cheaper than most other solutions in the market.

3) The main aim of this project is to enhance the standard of looking expertise for the customers.

III. METHODOLOGY

The system will be implemented into two parts. For each product, we will assign a specific ID using an RFID tag. These ID'S contain information on the products which are available in the database. RFID Reader connected to the cart reads these tags and sends product information from Cart to the Central billing unit through Zigbee. All the carts are equipped with an RFID reader, a microcontroller, and an LCD screen. Whenever the customer places the items in the trolley the peruser will examine the tag and will send information to the M/C and the information of the product will be shown on the LCD screen. After shopping the information/invoice will be given to the central unit and customers by phone/mail.

IV. SPECIFICATIONS OF THE SYSTEM

Specification	**Solution**
Scanning time	Radio Frequency Identification (RFID)
Real-Time Inventory Management	Online relational database implementation
Multi-User environment	Master-slave system topography star network architecture
Central server system	server application with multithreading implementation

V. ABBREVIATIONS AND ACRONYMS

- **RFID:** Radio-frequency identification

VI. BLOCKS OF THE SYSTEM

- The Arduino Uno Microcontroller.
- NRF24L01 transceiver module.
- RC522 RFID reader/writer Module.

VII. WORKING

The smart trolley is an advantage over the traditional shopping trolleys. This system will have an onboard billing unit so the user can see the value of the cart in real-time. The system consists of RC522 RFID Reader/Writer Module. and all the products will have an RFID sticker/tag stitched on them, so whenever the user adds an item to the cart, the cart RFID module in the cart will detect the sticker mounted on the product and scam the ID of the product, this ID will be sent to a central billing unit or a server from where the prices of the products and their description will be fetched, later this will be shown on the LCD mounted on the cart with the product description and the price of the item. "Fig. 1", shows the main blocks of the system.

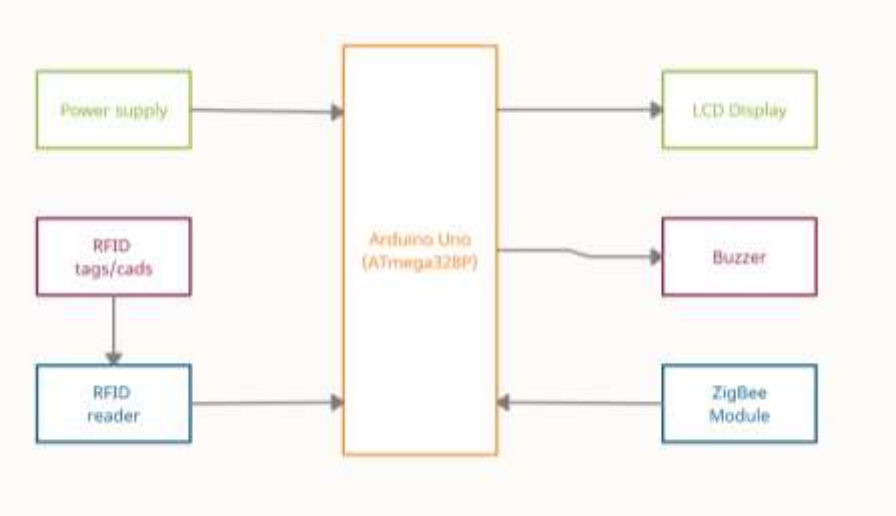

Fig. 1. Block diagram

VIII. TEST RESULTS

• Through tests and analysis

• RFID reader identifies the product and fetches it's price and information from the master server.

• Algorithm used for fetching the price and information is working properly.

• Algorithm for generating product bill is done successfully

• Display of final amount and cart scenario using LCD.

Note: Testing should be performed manually.

IX. ADVANTAGES

• Benefit to the customer: This system helps to save the time of customers which gets wasted in long queues at the billing desk as a Smart cart scans the product on the spot and generates the bill itself.

• Benefit to the malls: The manpower gets reduced as Smart carts do the billing job itself.

• Cost-efficient and user-friendly: This system requires less cost to design.

• This system is comparatively very user-friendly and customizable and it does not require periodic maintenance. Also, it is cost-effective and it is very easy to implement in big shopping malls or local stores.

X. CONCLUSION

Hence, it concluded that Smart shopping trolleys with automatic billing systems play a major role in shopping malls, improve the overall shopping experience, increase efficiency, and minimize long queues at billing units and time. We have successfully developed and implemented:

1) By concluding, this project we have worked on designing and developing an Intelligent smart cart that will help the customer reduce their shopping time in malls.

2) As the system is completely automated, it avoids manual errors and thus provides ultimate safety to the people.

3) Main aim of our project is to overcome the traditional method and to solve the problems faced by the customers during shopping.

XI. FUTURE SCOPE

1) Ability for spoken content

2) Ability for voice commands.

3) In the future this intelligence system will advise the customer which products can be removed from the basket if the budget exceeds.

4) Payment methods can be provided using biometrics/face detection.

5) Inner grocery store GPS product locator.

REFERENCES

[1] P. Chandrasekar, T. Sangeetha, *Smart shopping cart with automatic billing system through RFID and ZigBee*

[2] Zeeshan Ali, Prof. Reena Sonkusare, *RFID Based smart shopping, and Billing.*

[3] Prasiddhi K, Dhanashree H. Gawali, *Innovative shopping cart for smart cities*, 2017 2nd IEEE International Conference On Recent Trends in Electronics Information & Communication Technology (RTEICT), May 19-20, 2017.

[4] Ezhil Azhagan, R. Adithya, Y.L. Burhanuddin, F.charles *Automation product detection and smart billing for shopping using Li-Fi* [5] R. R. Vallabhuni, S. Lakshmanachari, G. Avanthi, and V. Vijay, *"Smart Cart Shopping System with an RFID Interface for Human Assistance"*, 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS), 2020.

[6] S. Mekruksavanich, *"Design and Implementation of the Smart Shopping Basket Based on IoT Technology"*, 2019 14th International Joint Symposium on Artificial Intelligence and Natural Language Processing (Isai NLP), 2019.

[7] D. Mohanapriya, R. Mohamed 6]Anas, P. Nandhini, N.M Deepika, *"Design and implementation of Smart Basket Cart Using Near Field Communication"*, Indian Journal of Emerging Electronics in Computer Communications 2018

[8] Karpagam, V., Balapriya, S., Kalairubini, G., & Kalaivani, *"Smart trolley with smart billing. International Journal of Computer Systems."* (2017).

[9] Yathisha, L., Abhishek, A., Harshith, R., Darshan Koundinya, S.R., Srinidhi, K., *"Automation of shopping carts to ease queues in malls by using RFID"* (2015).